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REPORT ON DEVELOPMENT OF AN EXPERIMENTAL ON LINE SYSTEM,(U)
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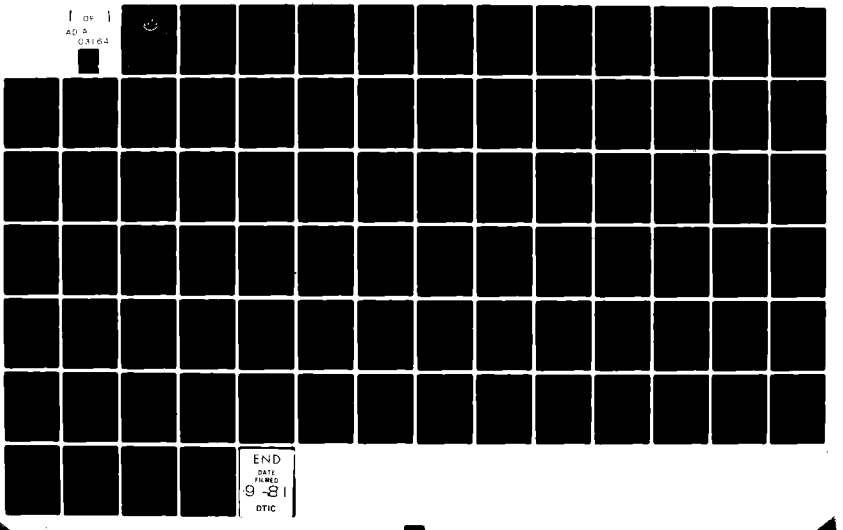

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UNITED STATES ARMY

COMPUTER SYSTEMS COMMAND

REPORT ON DEVELOPMENT OF
AN EXPERIMENTAL ON LINE SYSTEM

OCTOBER 1976

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FORT BELVOIR, VIRGINIA 22060

(16) REPORT ON DEVELOPMENT OF

AN EXPERIMENTAL ON LINE SYSTEM

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Prepared by the
US Army Computer Systems Command
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This report represents the first phase of a series of R&D efforts directed by the Department of the Army, Director of Management Information Systems (DA-DMIS) in support of their "Vertical Installation Automation Baseline" (VIABLE) project. Guidance for this effort was initially provided in a DA-DMIS tasking letter dated 16 Sep 1975 and subsequently modified through additional tasking letters in January and August of 1976. The report and the system which it describes has been a joint effort of the Advanced Technology and Personnel Systems Directorates of the United States Army Computer Systems Command. The assistance of personnel of the USA Military Personnel Center (MILPERCEN) and the Army Research Institute is gratefully acknowledged.

(10)
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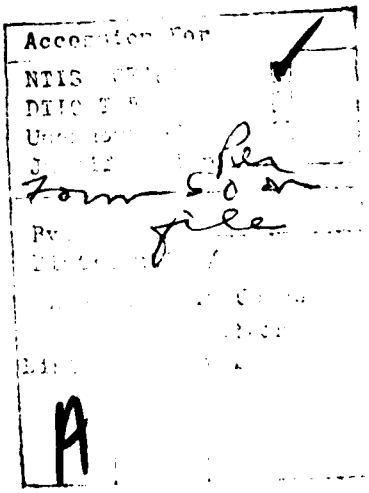


REPORT ON DEVELOPMENT OF

AN EXPERIMENTAL ON LINE PERSONNEL SYSTEM

1. INTRODUCTION. In September of 1975, USACSC developed a research plan (Plan 25-75) whose purpose was to explore and demonstrate those technologies which would conceivably be utilized in Army data processing systems developed over the next five to eight years. These areas included, on-line processing, formal data base management systems, mini and microcomputers and distributed data processing systems.

One aspect of this plan was to select a single functional area and build a baseline system which could be modified repetitively to add new features and migrate from one environment to another. At the direction of DA-DMIS, the Standard Multicommand System (SIDPERS), which processes Military Personnel actions, was selected. In accordance with the plan and DA-DMIS direction the experiment was to progress approximately along the following lines.

a. Phase I - Add a terminal control capability (Front End Module) and modify a sufficient portion of the existing SIDPERS to permit on-line processing of a representative number of transactions. Existing files were to be utilized and the TSO capability, currently available on the IBM 370, would be used.

b. Phase II - In this phase a minicomputer would be procured. The system would be converted to operate on the minicomputer, which would have a specifically designed terminal access method. Data base management would also be incorporated during this phase.

2. BACKGROUND. Development of the system began at the end of January 1976 when an ad hoc team of personnel from the Advanced Technology Directorate and Personnel Systems Directorate began the work described in paragraph 1a above. This team worked closely with a number of people from MILPERCEN in determining functional requirements, and was assisted by the Army Research Institute (ARI) in matters relating to man-machine interface associated with interactive systems.

The original intent was to derive the primary statistics required by DA-DMIS from the Phase II demonstration, and a test plan was developed for that purpose. It quickly became apparent that procurement delays would prevent Phase II from being implemented in a timely manner. The decision was therefore made to modify our test approach to attempt to derive as much meaningful statistics as we could from Phase I. The report which follows contains the details of that effort.

SYSTEM OVERVIEW

The Interactive SIDPERS Subset is composed of a Terminal Control Module, an I/O Module and a series of processing modules, which are briefly described below. Some additional information which generalizes the development approach are contained in the Summary and Conclusion section.

VIABLE TERMINAL CONTROL MODULE

The VIABLE Terminal Control Module (VTCM) is a COBOL program acting as an interface between the terminal operator and TSO. It is three levels removed from the IBM 370 operating system. Being executed under control of TSO, the VTCM can be operational only when TSO is "up". Data from two disk files are input to the VTCM, and data from the VTCM is output to two disk files.

The VTCM was designed to support multiple terminals in an on-line environment. In the VIABLE test configuration, support is limited to a maximum of three terminals. Structured programing techniques were utilized throughout the VTCM. Maintaining currency among terminals necessitated extensive use of indexing, in one instance to the level of three.

To begin processing SIDPERS transactions, the user must "LOGON" to the VTCM. Rudimentary password protection features are incorporated in the VTCM, and individual operator identification is maintained. Once "logged on" to the VTCM, the operator selects an input mode and processing begins.

In the direct-mode, the operator inputs a complete transaction in a manner which, for the most part, is consistant with current SIDPERS procedures. Each element of the transaction is validated syntactically, and if correct, passed to the VIABLE Terminal Processing Module (VTPM) for processing. If an element, or elements, are found to be invalid,

the operator is notified of the error and of the required corrective action to be taken.

In the tutorial-mode, the operator is prompted for each element of the selected transaction. The elements are validated as they are entered, and each element must be correctly entered before the operator is prompted for the next element. After the last element of the selected transaction has been entered, the transaction is passed to VTPM for processing.

In both modes, if an operator is unable to resolve an error condition, that operator may elect to cancel the transaction. The operator indicates his intention to terminate processing by "logging off" the VTCM.

An audit-trail file is created at the beginning of each session. The audit-trail file logs statistics on operator performance - by transaction and input mode. This audit-trail file is processed-off line and a report generated. A description of the files used by the Terminal Control Module may be found on the following page.

FILE DESCRIPTIONS

DDAUD - A file allocated at load time, used by the VIABLE Transaction Processing Module (VTPM) for Report Generation.

DDTAM - A file allocated at load time, used by the Terminal Analysis Module (TAM) for generation of statistical reports.

IMSGVAL - A file, used as input, which contains all validity error messages and prompting messages. It is an ISAM file keyed on the first three characters (Element Global Number).

IMSGCOM - A file, used as input, which contains all compatibility error messages. It is an ISAM file keyed on the first 3 characters (Compatability Error Number).

Note: All files referenced above are utilized by the VTPM.

VIABLE01

This program is called by the transaction modules to perform all I/O operations against the following SIDPERS master files:

1. SIDPERS Personnel File (SPF) - this file contains a record for each individual serviced by the SIDPERS.

2. Organization Master File (OMF) - this file contains a record for each unit serviced by the SIDPERS. Actual and authorized strengths for each unit are maintained.

3. Active Army Locator File (AALOC) - this file contains a record for each active Army unit.

4. Authorized Strength File (ASF) - this file contains a record for each authorized position in the units serviced by the SIDPERS.

5. MOS Master File (MOS) - this file contains a record for each valid Army MOS.

VIABLCØ2

This program performs the edit and update of Grade Change and Primary MOS (GRCH) transactions.

Function: The input transaction is compatibility edited against selected data from the SPF and MOS master files.

Function: If edit errors are detected, these are returned, via unique codes, together with an image (if applicable) of data from the master file that is incompatible to the terminal monitor program.

Function: If no errors are detected, the appropriate fields in the SPF are updated and a transaction register entry is output and control is returned to the terminal monitor program.

Function: If a transaction is cancelled by the terminal monitor program a transaction register entry is produced.

VIABLQ01

This program basically performs the edit and update of Duty Status (DYST) transactions.

Function: The input transaction is compatibility edited against selected data from the SPF and OMF master files.

Function: If edit errors are detected these are returned, via unique codes, together with an image (if applicable) of data from the master file that is incompatible with transaction data.

Function: If no errors are detected the appropriate fields in the SPF and OMF are updated; a transaction register entry is output and control is returned to the terminal monitor program.

Function: If a transaction is cancelled by the terminal monitor program a transaction register entry is output.

VIABLB01

This program is basically a switch that selects and calls the proper functional edit and update module to handle a given transaction. In addition, certain other operations are performed which are described below.

Function 1: Based upon type transaction, obtain SPF record to be edited and pass the transaction and associated master file record image to the proper functional edit and update module.

Function 2: "Cancel a transaction" processing is done much the same as function 1.

Function 3: Attempt to match an input SSN to the SIDPERS Personnel Master File and return the result to the terminal monitor program.

Functions 4 & 5: Open and close all files, respectively, and return to terminal monitor program.

VIABLCØ5

This module is entered via a call from VIABLBØ1, which passes to it in Linkage Section a DPRT transaction and the matching SPF record. The transaction is edited for compatibility of data elements; each time error is found the appropriate error message number is assigned and control is returned to the driver program for display to the operator. Transactions which successfully pass the edits update the SPF and the strength data on the appropriate Organization Master record. All I/O is accomplished by calling VIABLEØ1 with appropriate status codes.

VIABLCØ4

This module is entered via a call from VIABLBØ1, which passes to it in Linkage Section , an ARR transaction and the matching SPF record. The transaction is edited for compatibility of data elements; each time an error is found the appropriate error message number is assigned and control is returned to the driver program for display to the operator. Transactions which successfully pass the edits, update the SPF and the strength data on the appropriate Organization Master record. All I/O is accomplished by calling VIABLEØ1 with appropriate status codes.

VIABLCØ3

This module is entered via a call from VIABLBØ1, which passes to it in Linkage Section, a TDR (FIDN transaction). The transaction is edited for compatibility of data elements. Error messages are assigned for each error detected (maximum of 5 non-essential or 1 essential) and control is returned to the driver program for display of corrective action required. Transactions which successfully pass the edits cause a SPF record to be created as a pending gain.

VIABLAØ2

This program produces the Personnel Transaction Register. The report is in two parts and contains all transactions processed or attempted during execution of VIABLE.

PART I. Sorts the input transactions in UPC, process code sequence. Accumulates totals for processed and unprocessed transactions and lists the complete input transaction. In the case of a FIDN, the input data is converted to a four card TDR image. Adjusts the unit strength for Arrival and Departure Transactions.

PART II. Sorts the input summary record in originator sequence and accumulates totals by transaction type of processed and unprocessed transactions. Statistics on all errors are accumulated by transaction type.

TEST PROCEDURE DESCRIPTION

The SIDPERS Interactive Test was conducted from 21 June through 12 July 1976 at Headquarters US Army Computer Systems Command, Ft. Belvoir, VA. The hardware configuration utilized for this test consisted of an IBM 370/165, located at the Melpar Building, Falls Church, linked remotely to two IBM 3277 CRT Terminals, operating under TSO.

Military and civilian personnel representing MILPERCEN and USACSC were designated as test monitors, while the Army Research Institute in conjunction with USACSC was responsible for providing the man-machine and technical analysis.

Test participants were provided by the Ft Belvoir AG, MILPERCEN, and MDW Personnel. The participants comprised a wide mix of grades/ranks, job training, duty level, SIDPERS experience, civilian education terminal operating experience and data processing experience. (For a detailed breakdown, see Attachment 1, pages 1-2)

Prior to each test session participants were exposed to a short training program (1/2 hour) to familiarize them with terminal operation, system operation, and the use of source documents. (Note page 3, Attachment 1 for participants critique of this training.)

After the training session, the participants were assigned a unique user identifier code which they had to have to properly carry out the system logon procedure via the CRTs and which would later be used for identification purposes.

A mix of SIDPERS transactions was then given each participant. In particular, the types of transactions used for the test consisted of arrivals (ARR), departures (DPRT), duty status changes (DYST), grade changes (GRCH), inquiries (INQY), and updates (FIDN). (For sample transactions, see Attachment C). Upon successful completion of the logon procedure, the participant was directed by the system to indicate either of two processing modes which he wished to use. One mode, the tutorial, was designed to prompt the user via the system for all elements of information needed to successfully process the transaction. The second mode, designed basically for experienced operators, allowed the user to input all elements for processing at one time. The participant then examined the SIDPERS source documents to determine the appropriate type of transaction which he must process, and depending on the mode to be used, the following procedures were followed:

a. If the Direct Mode was selected, the complete transaction was entered on the CRT. If the data keyed into the system passed both the programs' validity and compatibility edits, the message "transaction processed" was displayed on the screen and the participant began the next SIDPERS transaction. In the event of a validity or compatibility error that particular field in error was displayed giving the operator an opportunity to correct or cancel the transaction.

This type of prompting continued until the transaction was successfully processed or or canceled, thereby insuring the integrity of the data base.

b. If the tutorial mode was selected, the CRT sequentially dis-played the information required for each field, if the operator response was erroneous the VTCM would generate a display indicating whether or not the field was critical to the transaction and why the field was not acceptable as entered. If the field was not critical, the user could bypass it and continue to the next field. If the field was critical, the user had one of two options available. The error could be corrected and processing continued or the transaction could be canceled.

One of the above procedures was followed for each transaction processed. Test participants in general were provided roughly two hundred transactions per four hour test session. Of the two hundred transactions usually not more than 25-40 transactions were ever attempted during a test session. A minimum of two test monitors were present at all times when testing was in progress to assist participants in resolving any system difficulties.

At completion of each individual test session, a log off procedure was performed by the test participant which internally executed a terminal analysis module (TAM). This TAM program was written to provide an audit trail of all Interactive SIDPERS transactions.

Two reports resulted from this TAM program. The first report, TAM 1, contained summary information about number of transactions attempted during the session, number actually completed, average processing time per transaction, etc. The second report, TAM 2, is a detailed breakdown by transaction of what happened during the session. (See Attachment B

for TAM Reports). In particular this report contains information about any errors which might have occurred during a particular transaction, how long it took to complete the transaction, how long it took to process each element in a transaction and lastly the number of characters which had to be displayed by the system and charaters inputted by the user.

TAM ANALYSIS

An integral part of the SIDPERS test is the evaluation of the statistical data collected by the TAM program. The object of the statistical evaluation was to determine reasonable average figures for a variety of factors.

The evaluation was broken into two general phases. The first involved merely the determination of average values, i.e., average processing time, average characters displayed, etc. The second phase involved the identification of trends or cycles in the data.

To aid in the analysis, a short statistical program was developed to accept TAM report input, massage the data and generate the appropriate basic statistical analysis. The results of the first phase analysis using this program can be subdivided into two categories. The first category resulted from doing the statistical analysis, incorporating all TAM reports and including data for all transactions attempted whether completed or aborted. The results of this can be found in Attachment D by transaction type.

The second category again incorporates all the TAM reports but includes only data from those transactions successfully completed. The results of this can be found in Attachment E by transaction type.

It should be pointed out at this time that no attempt has been made during the analysis to account quantitatively for possible sources of error. This is due to the fact that sufficient data was not collected

to accurately calculate potential error factors. Sources of possible error however will be identified in a subsequent section of this report.

The next aspect of the analysis concerned itself with any identifiable trends. This phase was the most difficult portion of the analysis. This was due to the fact that a significant portion of the data, approximately 30% collected, was lost due to system problems in the 370/165. Additionally, individuals tested were available for only short periods of time, 2-3 hours for 2-3 days, thus no real cyclic data could be collected to any great degree. Enough data was available however to warrant some general statement about the definite existence of a learning curve for the system. The exact nature and extent of the curve remains to be determined.

Another interesting observation concerns the processing time per transaction type per mode. There seems to be associated a 2:1 ratio between processing times for the tutorial and direct modes. By this we mean that for every minute it takes to process a specific transaction type directly it will take twice as long to do so in the tutorial mode.

This rule holds true for all transactions tested with the exception of the TDR which does not currently exist in the direct mode.

One last comment, because of the nature of the test sessions no data is available from which to determine the efforts of prolonged utilization on performance. Some effects however should be anticipated. The degree however would fluctuate by individual.

QUESTIONNAIRE ANALYSIS

As part of the Interactive SIDPERS Test, participants were asked to answer a summary SIDPERS Questionnaire form (See Attachment F). The basic objectives of the questionnaire were:

a. Provide information about the participant to aid in the test analysis phase (i.e., education level, training, ADP experience.)

b. Provide some type of feedback from the participants as to his reactions/feelings about the system.

AREA 1: GRADE - Thirty-two of the participants were military with grades ranging from PV2 through CWO and 1LT. Six were civilian employees in grades GS 2 and GS 12. (Note page 1, Attachment A for complete breakdown.)

AREA 2: DUTY LEVEL - Participants were drawn from five distinct levels of duty, the levels and percents tested were:

Unit 34%	MILPO 39%
USACSC 8%	MILPERCEN 13%
Dept of Army 5%	

AREA 3: SIDPERS TRAINING - Individuals had been trained in a variety of modes, as indicated:

Formal training at Ft Benjamin Harrison	18%
On the job training	42%
Installation training	13%
A combination of the above	21%
No training	5%

AREA 4: SIDPERS EXPERIENCE - This area covers the actual work environment exposure of the test participants to SIDPERS.

No work experience	13%
Less than 6 months	13%
6 months to 1 year	21%
1 year to 2 years	26%
over 2 years	26%

AREA 5: DATA PROCESSING EXPERIENCE - Provisions were not included on the questionnaire to qualify the experience indicated by the participants, therefore this area should only be considered as exposure to data processing.

No experience	45%
Less than 6 months	3%
6 months to 1 year	8%
1 year to 2 years	8%
Over 2 years	37%

AREA 6: TERMINAL OPERATING EXPERIENCE - The participants were requested to indicate their experience in terms of how many times they had actually used a remote terminal.

Never used terminal	68%
Used less than three times	11%
Used three to ten times	5%
Used over ten times	16%

AREA 7: CIVILIAN EDUCATION -

Less than 12 years	5%
12 years	39%
Less than 13 years	13%
Less than 14 years	16%
14 years	8%
Less than 15 years	3 %
16 years	5%
Over 16 years	11%

Areas 8, 9, and 10 of this section encompassed comments on a condensed training program conducted by the test administrators. The course was approximately 1/2 hour in length designed to provide the test participants instructions in terminal operation, system utilization and documentation handling.

AREA 8: TERMINAL OPERATION INSTRUCTION -

Poor	0%
Fair	8%
Good	11%
Excellent	81%

AREA 9: SOURCE DOCUMENT INSTRUCTIONS -

Poor	3%
Fair	3%
Good	22%
Excellent	72%

AREA 10: PROCEDURES FOR UTILIZING THE USER MANUAL -

Poor	3%
Fair	6%
Good	17%
Excellent	75%

AREA 11: TERMINAL DISPLAY INSTRUCTIONS - The interactive SIDPERS program was designed to provide a display of instructions and error messages on the CRT in order to aid the participants to communicate with the system, this and area 12 reflect the individuals opinion as to the effectiveness of these aids.

Poor	0%
Fair	3%
Good	18%
Excellent	79%

AREA 12: UNDERSTANDABLE ERROR MESSAGES -

Poor	0%
Fair	0%
Good	16%
Excellent	84%

AREA 13: SOURCE DOCUMENT INFORMATION - Transactions used in the test were inputted directly from source documents, this and area 14 pertain to data applicable to these documents:

Poor	0%
Fair	0%

Good	16%
Excellent	84%

AREA 14: UNDERSTANDABLE PERSONNEL ABBREVIATIONS -

Poor	0%
Fair	6%
Good	9%
Excellent	86%

AREA 15: TERMINAL DISPLAY TIME - This area pertains to the elapsed time from the test participants entry to the terminals response.

Response time satisfactory	30%
Response time too fast	5%
Response time too slow	65%

AREA 16: TERMINAL INTEREST - This area dealt with the test participants' personal opinions as to how interesting he/she found the interactive SIDPERS system:

Boring	0%
Indifferent	8%
Interesting	8%
Very interesting	84%

AREA 17: DIRECT MODE - The interactive SIDPERS test offered the capability to process in a direct or tutorial mode. This area answers the question what percent of test participants used the direct mode and what percent of their time did they use it:

Direct mode not used	32%
Direct mode used less than 25%	16%

18% of the individuals tested used the direct mode between 25-50% of the time

11% of the individuals tested used the direct mode between 50-75% of the time

18% of the individuals tested used the direct mode between 75-100% of the time

5% of the individuals tested used the direct mode 100% of the time

AREA 18: MODE PREFERRED - From participants using both modes, the following percentages were recorded:

Preferred the direct mode	77%
Preferred the tutorial mode	3%
Indicated no preference	19%

OBSERVATIONS

During the monitoring of the test sessions, personnel from both MILPERCEN and USACSC noted certain conditions occurring frequently. These observations can be summarized as follows:

a. On initial contact with the system, most individuals having no ADP experience appeared fearful of the system. The result of the apprehension was expressed in a hesitancy on the part of the participants to work with the system. After prompting thru several transactions, those with SIDPERS experience, and to a lesser degree, the unexperienced participants, were, in most cases, able to progress on the system in a confident manner. The apparent fear of the system was not of the system itself but fear in the fact that they might make a mistake and hence wreck either the system or some test individual's file. By walking through several transactions the individuals learned they could not hurt the system and thus started to relax and work with the system.

b. The system, as it exists now, can not be used by individuals without SIDPERS training or experience. The reason, simply stated, is that in order to utilize either the direct or tutorial modes an individual must, as a minimum, input the type of transaction he wishes to process.

c. It is the opinion of the Test Administrators representing MILPERCEN and USACSC that the above described problem could be eliminated by insuring that as a minimum, every SIDPERS clerk be required to attend a 2-3 day SIDPERS course. The course would cover both system utilization

and terminal operation with at least one half day reserved for hands on experience.

d. Some display and error messages provided information which tended to delay and/or confuse the operators rather than aid them. (Efforts are now underway to correct these messages for further test purposes).

e. TDR's proved too lengthly for processing under the current tutorial system. A need exists for development of new procedures for handling the TDR transaction, (FIDN).

f. The unpredictable function of the hardware configuration caused confusion and frustration among the participants, affecting their continuity of inputting transactions (participants acquired a rhythm while inputting data which was interrupted by said problem) often resulting in significantly increased transaction processing time.

e. It should be pointed out again that all observations are based on a small testing sample and that they should be used but with a completeunderstanding of their limitations.

PROBLEMS

No technical presentation would be complete without some discussion of the problems which occurred during this initial test phase.

The major area of difficulty and one totally independent of the Interative SIDPERS System centered around the CRT's used. To briefly summarize the difficulties, most were due to the CRT cursor jumping around on the screen. The result of this was threefold.

First, processing time for transactions where this occurred were lengthened thus altering to some degree the overall average values. Next the cursor jumping often generated directly or indirectly validity or compatability errors. This again lengthened processing time for transactions and additionally altered all statistics collected on error rates etc. Lastly and possibly the most significant result of this problem was frustration on the part of the test participants. This frustration with the cursor resulted in frustration with the system and a decrease in processing efficiency.

The other aspect of the test which could possibly effect the statistical values obtained is the teleprocessing package used during the test, TSO.

Some of the time associated with processing the transactions is a result of TSO overhead time which would not be associated with the system as envisioned on the PDP 11/70 which is to be used in Phase II.

The only problems specifically identifiable to the Integrated SIDPERS System encountered during the testing involved the processing of TDR transactions. In its present form the TDR consumes too much time to process and is quite boring to the individual processing it. Before this transaction could be fielded some improved format would need to be developed.

SUMMARY AND CONCLUSIONS

The DA DMIS Tasking letter of 16 Aug 76 posed a series of questions which constituted the objectives of this effort. This section provides summarized answers to these questions. In most cases these answers are somewhat qualified by the fact that the Interactive System was projected for a different hardware/software environment, i.e. minicomputers. The 370 version which this report describes, was originally designed to provide the ability to resolve functional problems only. The plan was to derive more precise measurements of system efficiency after conversion to the minicomputer testbed. It should be noted that all findings are based exclusively on the SIDPERS system. Findings could change with different functional logic and technical designs.

1. TERMINAL WORKLOAD CAPABILITY

a. Average processing time in the tutorial mode ranged from the worst case of 6:03 minutes to the best of 1:23 minutes. In terms of the direct mode, these figures were significantly smaller being for the worst case 2:55 and the best 0:54. In the tutorial mode, the average characters displayed ranged from 1027 to 150 characters, while characters received ranged from 51 to 17 characters. Again, as in the case of the processing time under the direct mode, these figures were greatly reduced. Characters displayed were between 128 and 28, while characters received ranged between 51 and 18.

b. On the 370 with TSO, we were not able to effectively measure communication characteristics. This will be done on the mini computer Test Bed (ref TAM Analysis, page 19 and Attachments B, D, and E). Note: Figures referenced above do not include FIDN which is still a laborious process.

2. HUMAN FACTORS IN INTERACTIVITY

a. The single most important finding concerns the acceptability of this approach versus the batch processing method currently used. This acceptability was not only by observation of the actual test but by the responses on the part of large numbers of potential users during the several briefings and demonstrations that were accomplished. The almost universal comment was, "This is great. When can we expect systems like this in the field?"

b. The ability to train terminal operators in the necessary technique appeared relatively simple. Although the training provided was extremely limited (Approximately 1/2 hour), the level of expertise achieved was sufficient to indicate that maximum training could be accomplished in probably a single day, even with relatively naive users.

c. While the test did suffer because of specific problem areas already discussed, such as poor response provided by TSO, the impact was not considered significant enough to alter the results. Therefore the values and trends found in this initial test can be accepted as a good indicator of what might be expected in the field.

d. The tutorial process used to prompt terminal users proved quite effective. However, it should be pointed out that a great deal of potential for optimization exists in this area. Further studies should be undertaken in the area of human factors with regard to software/hardware techniques and optimal query languages for man-machine communications (reference "Questionaire Analysis", page 21 and "Observations", page 27).

3. RESOURCE ESTIMATES FOR CONVERSION

a. CONVERSION OF SIDPERS FOR TEST

(1) The development of the 370 version of the Interactive SIDPERS Subset required approximately 1.125 man-years or 2,225 man-hours. This was broken down as follows.

(a) Personnel Systems Directorate: 1085 man-hours. This involved the development of the eight processing modules described in the System Overview begining on page 7.

(b) Advanced Technology Directorate: 640 man-hours used to develop the VIABLE Terminal Control Module described in the System Overview begining on page 4.

(c) MILPERCEN: 500 man-hours used to develop the tutorial responses and other functional changes described in para 4 of this section.

(2) It is reasonable to assume that conversion of the 370 subset to run on the PDP 11/70, would require approximately the same amount of manpower resources as above.

Some additional programing time would result from the required learning curve and the requirement to essentially reprogram the Terminal Control

Module to conform to the new terminal access method available on the DEC equipment. This would be roughly balanced out by the 500 hours spent in the functional area which would not be required in this case.

b. CONVERSION OF THE ENTIRE SIDPERS TO AN INTERACTIVE SYSTEM. Based on the total number of transactions in SIDPERS (approximately 180), a gross estimate of 49630 man-hours or 24 man-years can be extrapolated. This estimate is severely constrained by many factors; some of which are noted below.

(1) The full extent of functional changes that might be required cannot be determined at this time.

(2) Numbers of personnel assigned to the effort, and therefore training requirements, etc cannot be determined.

(3) The assumption is made that all necessary executive and/or supporting software required for development testing and maintenance would be provided by the hardware vendor and does not provide for in-house resources for this purpose.

(4) No estimate is included for developing adequate test procedures and/or management of the development effort.

(5) The estimate does not consider additional software requirements that might result from a requirement for vertical interactivity.

(6) The subset had no requirements for reports which would certainly exist in a full system.

4. LESSONS LEARNED AND CONCLUSIONS

a. The original assumption was that a Front End Module for terminal control could be used in conjunction with logic modules extracted almost intact from the existing system. In fact, this proved to be impractical.

b. The logic in the various processing modules was designed to handle multiple transactions. Any attempt to slice out specific statements related to one particular transaction would have been more complex than recoding.

c. In light of our limited experience, the assumption that a batch system can be converted to interactive with "minimal redesign", is very questionable. Considering that the experimental system was only a small subset of SIDPERS, a significant number of changes were necessary. Although most of these were technical or programing changes some functional changes were also required. For example:

o Some fields were found to be no longer necessary, such as effective dates which could be derived from the system with greater accuracy.

o Originator codes were not required on the transaction since the terminal established the originator code once, for all subsequent transactions.

o In the existing validation process, a shift in fields, such as would occur if a single character were left out of a field, could cause each subsequent field to generate a validity error. The interactive process treats each field separately and in a similar case would

generate only a single error which would be corrected before proceeding to the next field.

d. Some requirements for functional change were addressed at length, and in the final analysis were not resolved satisfactorily. A typical example is the FIDN update process. Although the Interactive SIDPERS accomplishes this process accurately, it is not terribly efficient. Experience gained offers many alternative methods which will provide much greater speed and efficiency.

e. It is also a fact that any system as complex as SIDPERS which has been operational over an extended period develops latent deficiencies which may cause no significant impact on the current operation, but could be disastrous if carried forward to a new environment. Unused blocks of coding or redundant coding are simple examples of this condition. No system developer need apologize for this. It is a traditional aspect of all large systems and results primarily from the frequent turnover of programing personnel and the unavoidable lag that occurs in keeping documentation current with the change process. Whether these result in requirements for technical changes or functional changes, no self respecting programer will open up a program for conversion and allow these conditions to remain. This was found to be the case in SIDPERS and would certainly be the case in any other system.

f. We have attempted to describe in this report, as accurately as possible, our own findings. No attempt was made to research the existing operational environment except as necessary to conduct our Field

Test. Detailed comparisons of the Interactive SIDPERS to the current environment can best be accomplished by DA DMIS and the proponent agency (MILPERCEN) who constantly monitor the SIDPERS system and therefore maintain adequate statistics for accomplishing the comparison.

g. Operating costs of the interactive system cannot be derived in the TOS environment. This will be accomplished on the PDP 11/70 when the equipment can be dedicated to the Interactive System and measured effectively. The interim testing conducted on the IBM 370 appears to demonstrate effectively that the savings in manpower required to prepare and submit transactions could more than offset the cost of terminals. Any comparison to the existing system should consider also the advantages of rapid response, the ability to maintain the currency of the data base, and the expanded query capability that will result.

Although these advantages are not easy to cost out, they do represent potential dollar savings particularly in the area of eliminating redundant errors, and the associated waste of resources. Admittedly, this concept is somewhat difficult to convey, but consider that current SIDPERS transaction processing involves a fairly constant error rate of approximately 12%. Consider also that SIDPERS cycles are run, perhaps at two, or even three day intervals. A single error may take two or more cycles to correct. In addition, it is quite common for one error transaction to result in many additional errors, as a result of the data base getting completely outdated with respect to an individual's record. From the above, it becomes quite evident that the effects of entering

erroneous transactions in to the system, and delay in correcting these errors, result in excess utilization of resources, for which cost factors can be established.

h. In its final review of this report, two questions were given careful attention as having significant impact in planning for future development of interactive systems. The conclusions regarding these questions were unanimously agreed to by every member of the project team. It is recognized that these conclusions are based on SIDPERS only and might not apply to the same extent to other systems.

(1) Is it feasible as a preliminary step to develop an interactive front end to collect transactions for submission to the existing batch process?

The conclusion is that this is certainly feasible from a technical point of view. Its advantages are:

(a) It would provide users, training or terminal operations that would facilitate the transition to full interactivity.

(b) It would eliminate syntax errors from the transaction input. Its primary disadvantage is that compatibility errors would not be eliminated.

(2) Can the transition from batch to interactive systems be accomplished with "minimal redesign"?

The conclusion here, again based only on SIDPERS, is definitely not. This transition is considered to be sufficiently complex to warrant the development of a completely new Detailed Functional Description and a comprehensive Master Plan for Development and Implementation.

ATTACHMENT A

BACKGROUND OF TEST PARTICIPANTS AND SUMMARY CRITIQUE

ATTACHMENT A

Grade:

Military

Number	Grade
2	E2
3	E3
12	E4
9	E5
3	E7
1	CW3
2	1LT

Civilian

Number	Grade
2	GS-02
4	GS-12

Level of Duty:

Unit	MILPO	USACSC	MILPERCEN	DPT OF ARMY	
13	15	3	5	2	
34	39	8	13	5	%

SIDPERS Training:

FORMAL - FT BEN HARRISON	OJT	COMBINATION	INST	NONE	
7	16	8	5	2	
18	42	21	13	5	%

SIDPERS Experience:

6 MO	6 MO - 1 YR	1 YR - 2 YR	2 YRS	NONE	
5	8	10	10	5	
13	21	26	26	13	%

Data Processing Experience:

6 MO	6 MO - 1 YR	1 YR - 2 YR	2 YRS	NONE	
1	3	3	14	17	
3	8	8	37	45	%

Terminal Operating Experience:

3 TIMES	3 - 10 TIMES	10	NONE
4	2	6	26
11	5	16	68

Civilian Education:

<12	12	<13	<14	14	<15	<16	16	>16
2	15	5	6	3	1	Ø	2	4
5	39	13	16	8	3		5	11

Terminal Operation Instructions:

Poor	Fair	Good	Excellent	N/A
Ø	3	4	29	2
	8	11	81 %	

Source Document Instructions:

Poor	Fair	Good	Excellent	N/A
1	1	8	26	2
3	3	22	72 %	

User Manual Procedures:

Poor	Fair	Good	Excellent	N/A
1	2	6	27	2
3	6	17	75 %	

Terminal Display Instructions:

Poor	Fair	Good	Excellent
0	1	7	30
	3	18	79

Understandable Error Messages:

Poor	Fair	Good	Excellent
0	0	6	32
		16	84

Source Document Information:

Poor	Fair	Good	Excellent	N/A
0	0	6	31	1
		16	84 %	

Understandable Personnel Abbreviations:

Poor	Fair	Good	Excellent	N/A
0	2	3	30	3
	6	9	86 %	

Terminal Display Time:

Too Slow	Too Fast	Satisfactory	N/A
24	2	11	1
65	5	30 %	

Terminal Interest:

Boring	Indifferent	Interesting	Very Interesting	N/A
0	3	3	31	1
	8	8	84 %	

ATTACHMENT B

SAMPLE TERMINAL ANALYSIS MODULE (TAM) REPORTS

TAM REPORT 1.

DATE - 760630 TIME - 111511* ORIGINATOR CODE - 01

TOTALS

TRANSACTIONS PROCESSED - 016
TRANSACTIONS CANCELLED - 001
COMPATIBILITY ERRORS - 005
VALIDITY ERRORS - 001
ELAPSED TIME - 003803

TRANS TYPE	PROCESSED	CANCELLED	AVG. TIME	ERRORS
ARR	003	000	000228	003
DPRT	002	001	000245	001
DYST	010	000	000133	001
GRCH	001	000	000411	001
INQY	000	000	000000	000
N	000	000	000000	000

TAM REPORT 2.

ORIGINATOR CODE - 01

TRANSACTION - DUTY STATUS MODE - TUTORIAL

ELEMENT	ERROR CODE	ENTRY TIME	ELEMENT TIME
TRANSACTION REQUEST		00:00:22	00:00:22
NAME (FIRST 5 OF)		00:00:19	00:00:19
SOCIAL SCRTY NUMBER		00:00:22	00:00:22
OLD DUTY STATUS CODE		00:00:55	00:00:55
NEW DUTY STATUS CODE		00:00:08	00:00:08
TIME OF CHANGE		00:00:16	00:00:16
EFF DATE OF DUTY STS		00:00:23	00:00:23
UNIT PROCESSING CODE		00:00:52	00:00:52

TIME TO PROCESS - 00:03:37
CHARACTERS DISPLAYED - 000526 CHARACTERS RECEIVED - 0036

* Note: All times are hhmmss.

TRANSACTION - DEPARTURE MODE - DIRECT

TIME TO PROCESS - 00:03:57
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - ARRIVAL MODE - DIRECT

TIME TO PROCESS - 00:02:21
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - DUTY STATUS MODE - DIRECT

TIME TO PROCESS - 00:01:46
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - DEPARTURE MODE - DIRECT

TIME TO PROCESS - 00:01:44
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - ARRIVAL MODE - DIRECT

TIME TO PROCESS - 00:01:11
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - ARRIVAL MODE - DIRECT

ELEMENT	ERROR CODE	ENTRY TIME	ELEMENT TIME
TRANSACTION REQUEST		00:01:13	
VALIDITY ERROR	063		
VALIDITY ERROR		00:01:05	00:01:05
COMPATIBILITY ERROR	402		
GAINING UPC		00:00:36	00:00:36
COMPATIBILITY ERROR	409		
GAINING UPC		00:00:26	00:00:52

TIME TO PROCESS - 00:03:54
CHARACTERS DISPLAYED - 000430 CHARACTERS RECEIVED - 0024

```
01  & 900D102655000000000
01  & 905T102745000000000
01DYST094T102807000000000
01DYST070T102826000000000
01DYST017T102848000000000
01DYST003T102943000000000
01DYST075T102951000000000
01DYST018T103007000000000
01DYST077T103030000000000
01DYST910T103122000000000
01DYST905T103126000000000
01DYST094T103142000000000
01DYST070T103156000000000
01DYST017T103218000000000
01DYST003T103229000000000
01DYST075T103243000000000
01DYST018T103312000000000
01DYST077T103335000000000
01DYST910T103352000000000
01DYST905T103354000000000
01DYST905D103415000000000
01DPRT910D103812000000000
01DPRT905D103813000000000
01ARR 910D104034000000000
01ARR 905D104035000000000
01DYST910D104221000000000
01DYST905D104223000000000
01DPRT910D104407000000000
01DPRT905D104407000000000
01ARR 910D104518000000000
01ARR 905D104519000000000
01DYST910D104635000000000
01DYST905D104639000000000
01DYST910D104731000000000
01DYST905D104736000000000
01DYST910D104829000000000
01DYST905D104830000000000
01DYST910D104934000000000
01DYST905D104934000000000
01DYST910D105031000000000
01DYST905D105043000000000
01DYST910D105139000000000
01DYST905D105140000000000
01DYST451T105250100000000
01DYST077T105251000000000
01DYST910D105331000000000
01DYST905D105331000000000
```

This data represents a dump of the Audit Trial from which TAM 1 and 2 reports were generated.

```
01  & 900D102655000000000
01  & 905T102745000000000
01DYST094T102807000000000
01DYST070T102826000000000
01DYST017T102848000000000
01DYST003T102943000000000
01DYST075T102951000000000
01DYST018T103007000000000
01DYST077T103030000000000
01DYST910T103122000000000
01DYST905T103126000000000
01DYST094T103142000000000
01DYST070T103156000000000
01DYST017T103218000000000
01DYST003T103229000000000
01DYST075T103243000000000
01DYST018T103312000000000
01DYST077T103335000000000
01DYST910T103352000000000
01DYST905T103354000000000
01DYST905D103415000000000
01DPRT910D103812000000000
01DPRT905D103813000000000
01ARR 910D104034000000000
01ARR 905D104035000000000
01DYST910D104221000000000
01DYST905D104223000000000
01DPRT910D104407000000000
01DPRT905D104407000000000
01ARR 910D104518000000000
01ARR 905D104519000000000
01DYST910D104635000000000
01DYST905D104639000000000
01DYST910D104731000000000
01DYST905D104736000000000
01DYST910D104829000000000
01DYST905D104830000000000
01DYST910D104934000000000
01DYST905D104934000000000
01DYST910D105031000000000
01DYST905D105043000000000
01DYST910D105139000000000
01DYST905D105140000000000
01DYST451T105250100000000
01DYST077T105251000000000
01DYST910D105331000000000
01DYST905D105331000000000
```

This data represents a dump of the Audit Trial from which TAM 1 and 2 reports were generated.

TRANSACTION - DEPARTURE MODE - DIRECT

TIME TO PROCESS - 00:03:57
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - ARRIVAL MODE - DIRECT

TIME TO PROCESS - 00:02:21
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - DUTY STATUS MODE - DIRECT

TIME TO PROCESS - 00:01:46
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - DEPARTURE MODE - DIRECT

TIME TO PROCESS - 00:01:44
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - ARRIVAL MODE - DIRECT

TIME TO PROCESS - 00:01:11
CHARACTERS DISPLAYED - 000026 CHARACTERS RECEIVED - 0000

TRANSACTION - ARRIVAL MODE - DIRECT

ELEMENT	ERROR CODE	ENTRY TIME	ELEMENT TIME
TRANSACTION REQUEST		00:01:13	
VALIDITY ERROR	063		
VALIDITY ERROR		00:01:05	00:01:05
COMPATIBILITY ERROR	402		
GAINING UPC		00:00:36	00:00:36
COMPATIBILITY ERROR	409		
GAINING UPC		00:00:26	00:00:52

TIME TO PROCESS - 00:03:54
CHARACTERS DISPLAYED - 000430 CHARACTERS RECEIVED - 0024

ATTACHMENT C

SAMPLE TRANSACTION INPUT

DEPARTMENT OF THE ARMY
U.S. ARMY MILITARY PERSONNEL CENTER
ALEXANDRIA, VIRGINIA 22332

ORDERS 303 — 11 June 1976

JONES, ROBERT ALAN 121-40-3517 SFC HQ CO USA GARRISON (WOU8GR) OU8AGR
Ft McPherson, GA 30330

YOU WILL PROCEED ON PERMANENT CHANGE OF STATUS AS INDICATED.

ASSIGNED TO: 293d MP Co (WHGJAAA) HGJAAA Ft Meade, MD 20755

REPORTING DATE: 15 June 1976

ADDITIONAL INSTRUCTIONS:
(a) You are to report to room 13, Building X, within 2 duty days after receipt of these orders for additional instructions concerning this travel.
(b) You will report between 0800 and 1700 hours on the scheduled reporting date.
(c) You are required to report to the Family Housing/Housing Referral Office serving your new duty station before you make housing arrangements for renting, leasing, or purchasing any off-post housing.

FOR ARMY USE
Auth: NA
Asgd to mgt dsg:
Pers con no:
MDC: 3AE
PEBD: NA
Format: 410
Control speciality: NA
PMOS/PSSI: NA
Enl/REENLB indic: NA
PPD: NA
Proj speciality: NA

FOR THE COMMANDER:

JAMES J. JACKSON
LTC, AGC
Adjutant General

DISTRIBUTION:
A,B

DAY 11 | 76

PERSONNEL REGISTER

For use of this form, see AR 210-10; the proponent agency is The Adjutant General's Office.

ORGANIZATION: (OHSAGR) HQ, CO USA, Garrison

DATE AND TIME IN (1)	DATE AND TIME OUT (2)	NAME (Print) (1st Line) SIGNATURE (2d Line) (3)	SOCIAL SECURITY NUMBER (4)	GRADE (5)	BRANCH (6)	HOME STATION AND ORGANIZATION (7)	AUTHORITY (SO TO Type Post) (8)	TEMPORARY ADDRESS AND TELEPHONE NUMBER (9)	DESTINATION AND AND PURPOSE (10)	DATE OUT TO RETURN (11)	STATUS AND LENGTH OF STAY (12)
	1 Apr 76	Jones, Robert Alan	121403517	SPC		Ft. McPherson, GA	SO 303 11 June 76		293 MP Co Ft Meade PCS	-	-

Information on this sheet is normally manually prepared. It is typed for the purpose of clarity on this sample.

DA FORM 647

REPLACES EDITION OF 1 JUL 64 WHICH WILL BE USED UNTIL EXHAUSTED.

C-2

DEPARTMENT OF THE ARMY
U.S. ARMY MILITARY PERSONNEL CENTER
ALEXANDRIA, VIRGINIA 22332

ORDERS 132 — 1 May 1976

NYBOE, JOHNATHAN WILLIAM 141428821 SSG W06T USA SE Region Recruiting Command (W06TAAA) College Park, GA 30337

YOU WILL PROCEED ON PERMANENT CHANGE OF STATUS AS INDICATED.

ASSIGNED TO: W005 Ft McPherson Det Region 1 (W00501A) Fort McPherson, GA 30330

REPORTING DATE: 1 May 1976

ADDITIONAL INSTRUCTIONS:
(a) You are to report to room 13, Building X, within 2 duty days after receipt of these orders for additional instructions concerning this travel.
(b) You will report between 0800 and 1700 hours on the scheduled reporting date.
(c) You are required to report to the Family Housing/Housing Referral Office serving your new duty station before you make housing arrangements for renting, leasing, or purchasing any off-post housing.

FOR ARMY USE
Auth: NA
Asgd to mgt dsg:
Pers con no:
MDC: 3AE
PEBD: NA
Format: 410

Control speciality: NA
PMOS/PSSI: NA
Enl/REENLB indic: NA
PPD: NA
Proj speciality: NA

FOR THE COMMANDER:

JAMES J. JACKSON
LTC, AGC
Adjutant General

DISTRIBUTION:
A,B

DATE: 1 [illegible] 76

PERSONNEL REGISTER

For use of this form, see AR 210-10; the proponent agency is The Adjutant General's Office

ORGANIZATION: W005 Det Region, Ft McPherson, GA

DATE AND TIME IN 1	DATE AND TIME OUT 2	NAME (Print) (1st Line) SIGNATURE (2d Line) 3	SOCIAL SECURITY NUMBER 4	GRADE 5	BRANCH 6	HOME STATION AND ORGANIZATION 7	AUTHORITY (SO TO, Type Pass) 8	TEMPORARY ADDRESS AND TELEPHONE NUMBER 9	DESTINATION AND PURPOSE 10	DATE DUE TO RETURN 11	STATUS AND LENGTH OF STAY 12
1200 1 May		Nyboe, Johnathan K.	141428821	SSG		W005D1A Det Region	SO 132	-	- -	-	PCS

Information on this sheet is normally manually prepared. It is typed for the purpose of clarity on this sample.

DA FORM 647

REPLACES EDITION OF 1 JUL 64 WHICH WILL BE USED UNTIL EXHAUSTED.

C-4

DATE: 1 Apr 76

PERSONNEL REGISTER

For use of this form, see AR 210-10; the proponent agency is The Adjutant General's Office

ORGANIZATION: (SYRAAA) HQ, USA, FORSCOM

DATE AND TIME IN (a)	DATE AND TIME OUT (b)	NAME (Print) (1st Line) SIGNATURE (2d Line) (c)	SOCIAL SECURITY NUMBER (d)	GRADE (e)	BRANCH (f)	HOME STATION AND ORGANIZATION (g)	AUTHORITY (AG TO, Type Post) (h)	TEMPORARY ADDRESS AND TELEPHONE NUMBER (i)	DESTINATION AND PURPOSE (j)	DATE DUE TO RETURN (k)	STATUS AND LENGTH OF STAY (l)
	1 Apr 76	Knese, Robert Gene	122489007	PV1		Ft McPherson	DK 31	2930 New St Atlanta, GA	LV	15 Apr 76	15 days

Information on this sheet is normally manually prepared. It is typed for the purpose of clarity on this sample.

DA FORM 647

REPLACES EDITION OF 1 JUL 64 WHICH WILL BE USED UNTIL EXHAUSTED.

C-3

ATTACHMENT D

TAM ANALYSIS

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

9 AUG 76

	ARRIVAL	
	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0028	0093
TRANSACTIONS PROCESSED	0021	0081
TRANSACTIONS CANCELLED	0007	0012
AVERAGE PROCESS TIME	00:05:23	00:02:49
CHARACTERS DISPLAYED	18552	8447
CHARACTERS RECEIVED	1325	4636
AVERAGE DISPLAYED	0663	0091
AVERAGE RECEIVED	0047	0050
PERCENT CANCELLED	0025	0013

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

9 AUG 76

DEPARTURE

	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0059	0093
TRANSACTIONS PROCESSED	0047	0081
TRANSACTIONS CANCELLED	0012	0012
AVERAGE PROCESS TIME	00:06:03	00:02:55
CHARACTERS DISPLAYED	45481	11925
CHARACTERS RECEIVED	2983	4769
AVERAGE DISPLAYED	0771	0128
AVERAGE RECEIVED	0051	0051
PERCENT CANCELLED	0020	0013

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

9 AUG 76

	DUTY STATUS	
	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0128	0178
TRANSACTIONS PROCESSED	0117	0168
TRANSACTIONS CANCELLED	0011	0010
AVERAGE PROCESS TIME	00:03:58	00:01:40
CHARACTERS DISPLAYED	81060	17505
CHARACTERS RECEIVED	5045	8689
AVERAGE DISPLAYED	0633	0098
AVERAGE RECEIVED	0039	0049
PERCENT CANCELLED	0009	0006

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

9 AUG 76

GRADE CHANGE

	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0005	0035
TRANSACTIONS PROCESSED	0003	0028
TRANSACTIONS CANCELLED	0002	0007
AVERAGE PROCESS TIME	00:05:55	00:01:48
CHARACTERS DISPLAYED	5135	3804
CHARACTERS RECEIVED	0222	1425
AVERAGE DISPLAYED	1027	0109
AVERAGE RECEIVED	0044	0041
PERCENT CANCELLED	0040	0020

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

9 AUG 76

	INQUIRY	
	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0012	0024
TRANSACTIONS PROCESSED	0012	0024
TRANSACTIONS CANCELLED	0000	0000
AVERAGE PROCESS TIME	00:01:23	00:00:54
CHARACTERS DISPLAYED	1803	0673
CHARACTERS RECEIVED	0204	0441
AVERAGE DISPLAYED	0150	0028
AVERAGE RECEIVED	0017	0018
PERCENT CANCELLED	0000	0000

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

9 AUG 76

FID-N

	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0007	0000
TRANSACTIONS PROCESSED	0006	0000
TRANSACTIONS CANCELLED	0001	0000
AVERAGE PROCESS TIME	00:25:57	00:00:00
CHARACTERS DISPLAYED	38745	0000
CHARACTERS RECEIVED	1780	0000
AVERAGE DISPLAYED	5535	0000
AVERAGE RECEIVED	0254	0000
PERCENT CANCELLED	0014	0000

ATTACHMENT E

ADDITIONAL TAM ANALYSIS

(Processed Transactions Only)

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

16 AUG 76

	ARRIVAL	
	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0021	0081
TRANSACTIONS PROCESSED	0021	0081
TRANSACTIONS CANCELLED	0000	0000
AVERAGE PROCESS TIME	00:05:23	00:02:49
CHARACTERS DISPLAYED	14395	6204
CHARACTERS RECEIVED	1039	3938
AVERAGE DISPLAYED	0685	0077
AVERAGE RECEIVED	0049	0049

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

16 AUG 76

	DEPARTURE	
	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0047	0081
TRANSACTIONS PROCESSED	0047	0081
TRANSACTIONS CANCELLED	0000	0000
AVERAGE PROCESS TIME	00:06:03	00:02:55
CHARACTERS DISPLAYED	40539	8771
CHARACTERS RECEIVED	2622	4073
AVERAGE DISPLAYED	0863	0108
AVERAGE RECEIVED	0056	0050

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

16 AUG 76

	DUTY STATUS	
	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0116	0169
TRANSACTIONS PROCESSED	0116	0169
TRANSACTIONS CANCELLED	0000	0000
AVERAGE PROCESS TIME	00:03:59	00:01:40
CHARACTERS DISPLAYED	73551	15342
CHARACTERS RECEIVED	4586	8130
AVERAGE DISPLAYED	0634	0091
AVERAGE RECEIVED	0040	0048

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

16 AUG 76

GRADE CHANGE

	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0003	0028
TRANSACTIONS PROCESSED	0003	0028
TRANSACTIONS CANCELLED	0000	0000
AVERAGE PROCESS TIME	00:05:55	00:01:48
CHARACTERS DISPLAYED	2736	1846
CHARACTERS RECEIVED	0113	1063
AVERAGE DISPLAYED	0912	0066
AVERAGE RECEIVED	0038	0038

VIABLE TEST EVALUATION REPORT

ORIGINATOR CODE - BP

16 AUG 76

FID-N

	TUTORIAL	DIRECT
TRANSACTIONS ATTEMPTED	0006	0000
TRANSACTIONS PROCESSED	0006	0000
TRANSACTIONS CANCELLED	0000	0000
AVERAGE PROCESS TIME	00:25:57	00:00:00
CHARACTERS DISPLAYED	33518	0000
CHARACTERS RECEIVED	1566	0000
AVERAGE DISPLAYED	5586	0000
AVERAGE RECEIVED	0261	0000

ATTACHMENT F

SIDPERS SAMPLE QUESTIONAIRE

SIDPERS-OL QUESTIONNAIRE

Prepared by
Field Systems Development Branch
Field Military Systems Division
USA Military Personnel Center
Alexandria, Virginia

1. The purpose of this questionnaire is to provide statistical data for evaluating SIDPERS under interactivity. No names or social security numbers will be used.

2. Please answer all applicable questions as accurately as possible. Your responses could influence how SIDPERS will be designed in the future. If you have any questions, please raise your hand.

3. There is no time limit. When finished, please raise your hand and a test monitor will pick up your questionnaire.

Fill in the blanks for the following six (6) questions. These questions are for categorizing and matching test data with questionnaires only. Do not place your name or social security number anywhere on this questionnaire.

1. Terminal (1, 2, or 3) _____

2. PMOS _____ ASI if known_____

3. DMOS _____ ASI if known_____

4. Orignator code used for test _____

5. Grade _____

6. Date of participation _____

Respond to the following questions by placing the appropriate letter in the space provided or follow specific instructions.

7. Level of Duty _____

   a. Unit
   b. MILPO

8. I learned SIDPERS by _____

   a. Formal schooling (Ft Ben Harrison)
   b. On-the-job-training (OJT)
   c. Installation training
   d. Combination of above
   e. No instruction in SIDPERS

9. I have worked with SIDPERS _____

   a. Less than six months
   b. Six months to one year
   c. One-two years
   d. Over two years
   e. Never worked with SIDPERS

10. I have had data processing experience _____

   a. Less than six months
   b. Six months to one year
   c. One-two years
   d. Over two years
   e. No experience in data processing

11. I have had previous terminal operating experience _____

a. Less than three times
b. Three-ten times
c. Over ten times
d. No previous operating experience

12. Civilian education level _____

a. Non-high school graduate
b. High school graduate
c. Less than one year of college
d. Less than two years of college
e. Associate Degree
f. Less than three years of college
g. Less than four years of college
h. Four year college degree
i. Over four years of college

13. Instructions given about terminal operation were _____

a. Excellent
b. Good
c. Fair
d. Poor

14. Instructions given about use of source documents were _____

a. Excellent
b. Good
c. Fair
d. Poor

15. User Manual procedures were understandable _____

a. All the time
b. Most of the time
c. Part of the time
d. None of the time

16. Terminal instructions were understandable _____

a. All of the time
b. Most of the time
c. Part of the time
d. None of the time

17. If response to above was other than A, give some examples

18. Error messages were understandable _____

a. All of the time
b. Most of the time
c. Part of the time
d. None of the time

19. If response to above was other than A, give some examples

20. Source documents provided contained necessary information ____

a. All of the time
b. Most of the time
c. Part of the time
d. None of the time

21. If response to above was other than A, give some examples

22. I referred to the User Manual _____

a. All of the time
b. Most of the time
c. Part of the time
d. None of the time

23. Personnel abbreviations (BASD, ETS, ETC) were understood _____

a. All of the time
b. Most of the time
c. Part of the time
d. None of the time

24. If response to above was other than A, give some examples

25. Waiting time for messages displayed on the terminal was _____

a. Too short all of the time
b. Too short most of the time
c. Too short some of the time
d. About right
e. Too long some of the time
f. Too long most of the time
g. Too long all of the time

26. Did you find using a terminal for SIDPERS _____

a. Very interesting
b. Interesting
c. Indifferent
d. Boring

27. I used the direct mode of input

a. None of the time
b. Under 25% of the time
c. Under 50% of the time
d. Under 75% of the time
e. Under 100% of the time
f. 100% of the time

28. I preferred

a. The direct mode of input
b. The tutorial assisted mode of input
c. Both methods about the same
d. Neither mode of input

29. The following area is reserved for any comments and/or suggestions you may have regarding your participation in this exercise.

ATTACHMENT G

PROJECT VIABLE TEST PLAN

PROJECT VIABLE TEST PLAN

1. Description of test: Project VIABLE

a. Functions to be tested

(1) Interactive processing

(2) Batch processing (stand-alone/concurrent)

(3) Hardware utilization

(4) Man-machine interface

b. Location of test:

(1) Test to be conducted at Ft Belvoir, HQ USA Computer Systems Command, Bldg. 1465

(2) Configuration/Facilities required

(a) IBM 370 computer

(b) PDP 11/70 minicomputer

(c) Two remote terminals on-line to the PDP 11/70

c. Time frame: Test will be conducted with the PDP 11/70 during the Feb-Mar 77 period.

d. Personnel

(1) Test Monitors - Personnel from Milpercen and USACSC

(2) Test Participants - Personnel from Ft Belvoir, UNITS, MILPO and SIB to operate the interactive terminals

e. Objectives: To demonstrate that the interactive system will properly handle SIDPERS transactions as currently being processed, but in a more timely manner while achieving significant economies.

f. Hardware/Software monitoring: Performance data will be collected and analyzed using the attached performance monitoring plan (attachment 1), permitting comparisons in the following environments or such others as may be deemed necessary.

(1) Interactive SIDPERS under existing file structure.

(2) Interactive SIDPERS under the integrated data base management system.

(3) SIDPERS processing on Host IBM 370/165 utilizing the PDP 11/70 as a dedicated back end processor.

(4) SIDPERS processing on Host PDP 11/70 utilizing the IBM 370/165 as a dedicated back end processor.

(5) Interactive SIDPERS using single and/or multiple terminals.

(6) SIDPERS under varying load conditions.

(a) Interactive SIDPERS running by itself

(b) Batch version by itself

(c) Interactive SIDPERS with batch in a multiprograming environment

2. Responsibilities:

a. For conduct of test - USACSC

b. For validation of functional operation - MILPERCEN

c. For program validation - USACSC

d. For providing test conditions and files - MILPERCEN/USACSC

e. For man-machine analysis - USACSC

f. For facilities - USACSC

g. For test participants - Ft Belvoir MILPO/MILPERCEN

3. Performance requirements: Overall performance will be measured in three essential categories.

a. Elimination of errors. The interactive system will provide an audit trail of errors occuring in the submission of each transaction; however, since only valid transactions will be processed we will compare this to both the batch process test and existing statistics to determine ability of the interactive system to eliminate error transactions from entering the system.

b. Conformance to functional specifications. Since any change to the functional specifications for prototype development does not affect the desired output, we will consider the system to be functionally correct if the Master Files updated interactively are identical to the same Master Files updated by using the existing batch SIDPERS.

c. System Efficiencies

(1) Response time. Since response times will not be determined until the test has been conducted, these efficiencies will be arrived at based on the following general criteria.

(a) The human factor requirements necessary to satisfy the terminal operator that he is able to interface with the computer without unreasonable delay.

(b) That the response time required to update files is significantly reduced.

(2) A specialized Terminal Analysis Module (TAM) will be incorporated in the Terminal Control Module (TCM) to provide timing statistics. This

module will include improvements resulting from lessons learned in the interim test.

(3) General

(a) That the overall system throughput is increased and processing costs reduced either directly or by permitting economies of operation in related areas.

(b) That system capability to maintain the currency of personnel files is significantly increased.

4. Procedures/Steps utilized in performing final test PDP 11/70.

a. Step 1 - Brief participants upon use of the remote terminal to include logon procedures, error handling and transaction processing. In addition some explanation as to the available source documents to be used will be given by MILPERCEN.

b. Step 2 - Schedule individual participants on the two CRT's and assign them appropriate organization identifier codes.

c. Step 3 - Distribute to those individuals at the terminals the required source documents and reference manuals.

d. Step 4 - Begin test situation making sure that test monitors will be available to provide assistance if the need arises. During the test in the event of system errors/failure or other difficulties the monitors will aid the test participants where possible logging such actions as were taken.

e. Step 5 - Upon completion of all transactions a break will be called to allow test monitors time to process statistical reports and

arrange for continuation of the session.

f. Step 6 - New source documents will be provided the participants and the test will resume.

g. Step 7 - Upon completion of the final set of transactions the test session will come to a close. All source documents will be collected and the test monitor will process the required statistical reports.

h. Step 8 - All test participants will be debriefed to ascertain their reaction to the user of the terminal and or the conduct of the test.

i. Step 9 - Test monitors will review statistical reports and the results of the debriefing to identify areas in the test which may need modification. Such modifications will be accomplished where possible.

5. Test parameters

a. Duration of test - 3 weeks.

b. Number of test participants per testing session - 2 individuals.

c. Test session length - 4 hours.

d. Number of source documents available - 300

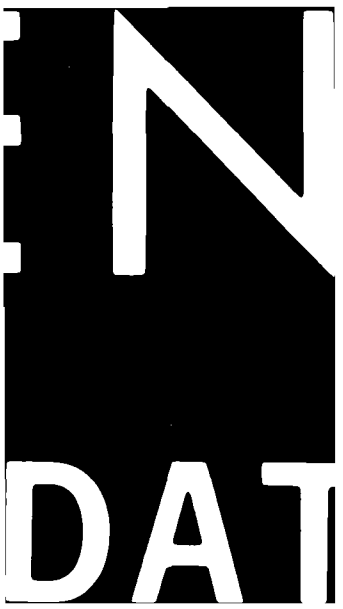
6. Criteria for selection of test subjects

a. Minimum CL score of 90

b. Background

(1) Experienced: Presently involved in SIDPERS

(2) Inexperienced: No previous SIDPERS experience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